

Docket No.: 50429-281

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

AKIHIKO TAKABATAKE, et al.

Serial No.: 08/908,599

Filed: August 08, 1997



Group Art Unit: 2713

Examiner: Y. Lee

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For: PICTURE DECODING & DISPLAY UNIT INCLUDING A MEMORY HAVING REDUCE
STORAGE CAPACITY FOR STORING PIXEL DATA

TRANSMITTAL OF SUBSTITUTE APPEAL BRIEF

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Submitted herewith in triplicate is Appellant(s) Substitute Appeal Brief in support of the Notice of Appeal filed May 17, 2000. This substitute Brief is filed in response to the Office communication, dated September 26, 2000, which imposed a time limit of one month for filing a new complete Brief that appropriately identifies the grouping of the claims on Appeal. While it is believed that no additional fee is necessary, please charge any required fee to Deposit Account 500417.

Respectfully submitted,

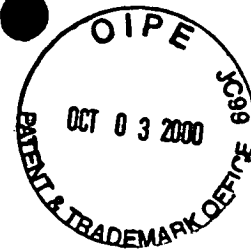
MCDERMOTT, WILL & EMERY

A handwritten signature in cursive script, appearing to read "Gene Z. Robinson".

Gene Z. Robinson
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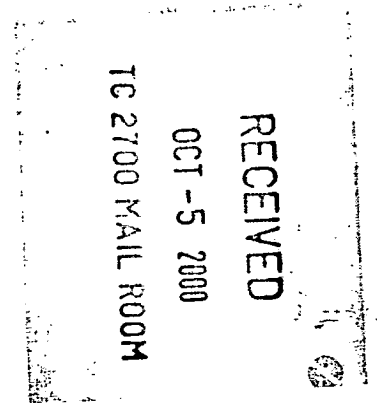
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TABLE OF CONTENTS



Page

I.	REAL PARTY IN INTEREST.....	1
II.	RELATED APPEALS AND INTERFERENCES	1
III.	STATUS OF CLAIMS	2
IV.	STATUS OF AMENDMENTS	2
V.	SUMMARY OF INVENTION.....	2
VI.	ISSUES	4
VII.	GROUPING OF CLAIMS	4
VIII.	ARGUMENT.....	4
IX.	CONCLUSION.....	8
	APPENDIX.....	10



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APPEAL BRIEF

Assistant Commissioner for Patents
Washington, DC 20231

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Sir:

This Brief is submitted pursuant to the appeal of the final rejection of claims 1 through 10, filed
May 17, 2000.

I. REAL PARTY IN INTEREST

The real party in interest in this application is Mitsubishi Denki Kabushiki Kaisha.

II. RELATED APPEALS AND INTERFERENCES

No other appeals or interferences are believed to affect or be affected by a decision in this
appeal.

III. STATUS OF CLAIMS

Claims 8 through 10 stand under final rejection. Claims 1 through 7, 11 through 13, 15 and 18 through 28 have been withdrawn as being directed to a non-elected invention pursuant a requirement for election of species. No other claims are pending.

The withdrawal of claims 1 through 3 occurred only upon the final rejection, leaving appellant no real opportunity to respond to the withdrawal of these claims. Appellant maintains that claims 1 through 7 are readable on Fig. 12, the same figure upon which rejected claims 8 through 10 are readable and, therefore, appropriate for consideration in this Appeal.

IV. STATUS OF AMENDMENTS

No claim amendments have been proposed after the final rejection of November 18, 1999.

V. SUMMARY OF INVENTION

The present invention relates to decoding encoded picture data for display. Predictively encoded moving picture data in MPEG format is decoded in a manner to reduce storage capacity necessary for storing "B" pictures during the MPEG decoding process. The present invention is directed to overcoming a prior art problem arising when decoding and display are simultaneously carried out, as described beginning at page 45 of the specification. To summarize the problem, pixel data of even fields of a B frame which have not yet been displayed can be overwritten by pixel data of a macro block of the next B frame.

In the present invention, timing for starting decoding of encoded pixel data is set after display of one macro block line is completed. With this delay, substitution of new pixel data occurs only for pixel data that has already been displayed. The invention, illustrated in Fig. 12, is based on the

recognition that it need not be feared that completion time for decoding a B frame (e.g., B1) would be prolonged into the next frame period when the display speed and the decoding speed for each B frame are identical.

As shown in Fig. 12, the start of frame decoding is delayed by a period T_d , which corresponds to a display period for pixel data of one macro block line with respect to a picture synchronizing signal PSYNCH that defines a frame period. Decoding processing of pixel data of each frame is completed within a period which is shorter than one field period, as exemplified in the sequence of Fig. 3, due to the time allotted for analyzing header information and refreshing DRAM memory. Thus, even if the decoding start time is delayed, as shown in Fig. 12, the decoding operation for the B frame is completed within the frame period. Pixel data of one frame are decoded and written in one defined frame period.

Reference is made to the specification for a more detailed description of the present invention. Independent claim 8 is presented below with elements read on drawing figures, as urged in MPEP 1206.

8. A picture decoding (10, Fig. 1) and display (22) unit for decoding predictively encoded pixel data of a picture included in an incoming bit stream, restoring original pixel data and outputting the restored original pixel data for display on a display unit, said picture formed by a frame of a plurality of fields (ODD, EVEN, Fig. 4), said picture decoding and display unit comprising:

decoding means (10) coupled to receive said bit stream, for carrying out said decoding processing on said predictively encoded pixel data to restore said original pixel data;

storage means (12) coupled to said decoding means, for storing said restored pixel data received from said decoding means;

read means (16) coupled to said storage means, for reading pixel data from said storage means for outputting to said display unit for display thereon; and

control means (14) coupled to said read means and said decoding means for making said decoding means start decoding said decoding means start decoding processing of pixel data of a subsequent frame (B2, Figs. 4, 12) supplied subsequently to a certain frame (B1, Fig. 4) including a last field to be finally displayed in the certain frame in response to reading of said last field from said read means, said subsequent frame supplied immediately following a picture having the decoding processing thereon completed upon the reading of said last field, said picture being different from a picture comprised of said certain frame.

As stated in the section of the Manual noted above, the claims are not to be limited to this embodiment by such reading.

VI. ISSUES

Whether claims 1 through 7 are appropriately subject to consideration in this appeal.

Whether claims 8 through 10 stand appropriately rejected under 35 U.S.C. §102(e) as being anticipated by of U.S. Patent 5,398,072 to Auld. (hereinafter "Auld").

VII. GROUPING OF CLAIMS

Claims 1 through 7 are grouped together and treated in argument I in the "Argument" section below. Claims 8 through 10 are grouped together and treated separately from claims 1 through 7 in argument II in the "Argument" section below.

VIII. ARGUMENT

I. The Withdrawal of Claims 1 through 7 from Consideration

This issue, it is submitted, is a substantive issue based on the merits of the claim subject matter and, therefore, not subject to decision on petition. Claims 1 through 3 (among other claims that are not on appeal herein) had been examined and rejected, prior to the final Office Action, under the second

paragraph of 35 U.S.C. §112, apparently for the reason that the Examiner was unable to read the language of independent claim 1 on the elected invention (see, for example, the Office Action dated April 15, 1997). No other explanation was given for concluding that the claims fail to meet the statutory requirements of 35 U.S.C. §112. The Examiner thus held, inferentially but not explicitly, that claims 1 through 3 were not drawn to the elected species of invention. In response, appellant traversed on the following basis.

The rejection was made on the ground that the claims are not directed to the elected subject matter, but rather to embodiment 1 as disclosed at pages 25-44 of the specification. It was submitted that the statement of the rejection in the Office Action does not purport that the subject matter recited in these claims cannot be understood, but rather that they are not readable on the elected species of invention. Yet the claims were rejected, as opposed to having been held withdrawn as not readable on the elected species. It was submitted that the procedure undertaken in the Office Action is inappropriate to support the position taken. It was urged that the claim recitations not only meet the requirements of 35 U.S.C. §112, but also are readable on the elected species of the invention.

The elected species (as described in the response of January 2, 1997) is readable on Figs. 11-15. Fig. 12 shows the time period T_d corresponding to one macro block line. Although the start timing of decoding a B picture is delayed by one macro block line period T_d relative to assertion of the signal PSYNC, the time difference between the start of decoding of the B picture and the reading of the decoded picture is one field time period plus one macro block line. The embodiment of Fig. 12 is an improvement of embodiment 1 and others described in the specification. That is, embodiment 2 (to which, it is urged, that all claims on appeal are readable) indicates the time difference between the picture decoding start and the picture reading start. A delay of one macro block line is not singly employed in embodiment 2 but is added to the frame period that occurs after reading and displaying of

the previous block has begun. Dependent claim 2 requires the one macro block line delay. Fig. 12 clearly indicates such relationship. It was submitted that the B picture, I picture and P picture subject matter is clearly recited in independent claim 1.

The final rejection simply withdrew the rejection of claims 1 through 3 and, instead, withdrew these claims from consideration as not being readable on the elected species. The Office Action did not address appellant's remarks, described above, that urged that claim 1 and its dependent claims are readable on the elected species. No explanation was given in the Office Action in support of the Examiner's holding. As the Office Action was made final, thereby closing prosecution, appellant was denied the opportunity of traversing this holding. The submission filed under 37 CFR 1.116 was denied entry.

The issue presented herein is not whether the requirement for election of species is proper. Although appellant believes that the traversal of the requirement remains appropriate, the avenue for decision thereon is believed to be by petition. It is submitted that the issue herein is whether claim 1 and its dependent claims 2 through 7 are readable on the elected species of Fig. 12, a merits issue that is solely determinable on comparison of the recitation with the disclosed elected species. Such an issue is not determinable on petition.

It is respectfully urged that the Examiner's holding that claims 1 through 7 are drawn to a non-elected species be reversed. Fig. 12 indicates that the period between PSYNC signals includes two field periods. The time at which decoding of block B2 starts is delayed a period T_d for one macro block line after the field period for displaying block B1 (ODD). That is, in response to reading the block B1 (ODD) for display, decoding of block B2 occurs but delayed by the frame period for reading block B1(ODD) and T_d . The last clause of claim 1 recites that the start of decoding of a subsequent frame occurs after reading and displaying the last field of the earlier frame. Dependent claim 2 further

requires the one macro block line delay. Claims 3, 4 and 7 are dependent from claim 2. Claims 5 and 6 are dependent from claim 1. It is submitted, therefore, that claims 1 through 7 are readable on Fig. 12 and should not have been denied examination on their merits.

II. The rejection of claims 8 through 10 under 35 U.S.C. §102(e) for anticipation by Auld.

Claims 8 through 10 have been rejected under 35 U. S. C. §102(e) as being anticipated by Auld. Reference is made in the Office Action to an earlier Office Action for the rationale for rejection. Reference is made to Fig. 5 of Auld for disclosing that picture P2 is different from picture 1, which comprises P1, F1. It is thus contended therein that this arrangement meets the subject matter recited in claim 8.

Claim 8 recites that the control means makes the decoding means start decoding operation of a (subsequent) frame supplied subsequently to a certain frame. The claim is directed to the processing of a B frame as illustrated in Fig. 12. As claim 8 requires the decoding means decoding . . . to restore said original pixel data, the claimed decoding means includes the reconstruction of an encoded picture. Therefore, the subsequent frame is applied to the decoding means.

In Auld, three memories are employed for the picture store. If two memories are not currently occupied in the picture store, the decoded picture bits are reconstructed into a corresponding picture and then stored in an available memory in the picture store. If two memories are occupied, a picture stored in one of the two memories is read out by the display controller, a newly reconstructed picture is transferred to the picture store for storage therein, and a previously decoded picture is reconstructed into a picture (col. 12, line 14 et seq.). Auld's reconstruction unit changes the picture sequence in the decoding operation or in the received bit stream into the picture sequence of the display. Therefore, Auld does not suggest changing of the picture sequence in the reading for display with B-picture

considered because Auld performs such changing of the picture sequence in the reconstruction unit. Of course, Auld considers the B-picture in the reconstruction unit for the picture sequence changing. In addition, Auld does not consider the timing relation between the decoding of the received encoded picture data and the reading of the reconstructed picture data, although Auld mentions the synchronization of the decoding, reconstructing and displaying process.

In Fig. 5 of Auld, the same character is used for the picture between the reconstruction sequence and the display sequence, and indicates that the reconstructed picture is then output for display with a delay of a field period. In col. 13, lines 47 et seq., Auld describes that P1 represents a first picture, A and B represent portions of a picture, and F1 and F2 are the first and second field of a reconstructed picture. Therefore, Auld is not concerned with whether a picture read for display is a B-picture.

Claims 9 and 10 are dependent from claim 8 and recite additional details. Accordingly, it is urged that Auld does not anticipate claim 8 and its dependent claims 9 and 10.

IX. CONCLUSION

It is submitted that the refusal to examine claims 1 through 8 on their merits is in error. It is further submitted that the rejection of claims 8 through 10 under 35 U.S.C. §102(e) as being anticipated by Auld is in error. Reversal is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including

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extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

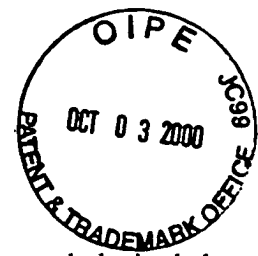
Respectfully submitted,

MCDERMOTT, WILL & EMERY

A handwritten signature in black ink, appearing to read "Gene Z. Robinson", written over a horizontal line.

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APPENDIX

1. A picture decoding and display unit for decoding predictively encoded pixel data of a picture included in a supplied bit stream, restoring original pixel data for outputting to a display unit for display thereon, said picture being formed by pixel data of a frame having two fields, said picture decoding and display unit comprising:

decoding means coupled to receive said bit stream, or extracting said pixel data included in said bit stream and carrying out said decoding processing on the extracted pixel data to restore said original pixel data, said decoding means including means for extracting information indicating whether a type of said frame of the supplied pixel data included in said bit stream is an I/P picture employed as the reference picture but subjected to only display, for identifying the type of said frame;

memory means coupled to said decoding means for storing the pixel data of said B picture restored by said decoding means in accordance with a B picture identification indication signal from said decoding means;

read means coupled to said memory means for reading the pixel data stored in said memory means and outputting the read out pixel data to said display unit for display; and

control means coupled to said decoding means and said read means for controlling operation timings of said decoding means and said read means such that time difference between a timing for starting said decoding processing of a B picture and that for outputting the restored pixel data of said B picture from said memory means to said display unit through said read means is substantially one field time required for outputting one field pixel data of said B picture to said display unit, said control means including means for starting a decoding operation of a first field of a subsequent frame in response to starting of reading of pixel data of the last field of the decoded and stored frame to the display unit.

2. The picture decoding and display unit in accordance with claim 1, wherein said decoding processing is carried out in units of blocks of the pixel data of prescribed sizes on a screen, and picture including M said blocks in a horizontal direction on said screen and

said control means further includes delay means for equivalently delaying said timing for starting said decoding processing of said decoding means by a time required for reading said pixel data of said M blocks from said memory means.

3. The picture decoding and display unit in accordance with claim 2, wherein said delay means includes buffer memory means arranged between a pixel data output part of said memory means and an output port of said read means being coupled to said display unit, for storing supplied said pixel data for a prescribed time.

4. The picture decoding and display unit in accordance with claim 2, wherein said bit stream includes data structure information indicating whether said pixel data of said picture are supplied in a unit of a field or in a unit of a frame including said pixel data of said two fields in a mixed state, and

said decoding means includes extraction means for extracting said data structure information from said bit stream and designating a data structure indicated by said data structure information,

said control means including means for inactivating said delay means in response to indication of said units of said fields by said data structure information supplied from said extraction means.

5. The picture decoding and display unit in accordance with claim 1, wherein said pixel data are supplied in units of said fields.

6. The picture decoding and display unit in accordance with claim 1, wherein said memory means is formed by a frame memory storing one frame worthy amount of pixel data.

7. The picture decoding and displaying unit in accordance with claim 2, wherein said control means delays the start timing of decoding the pixel data of a B picture immediately following another B picture.

8. A picture decoding and display unit for decoding predictively encoded pixel data of a picture included in an incoming bit stream, restoring original pixel data and outputting the restored original pixel data for display on a display unit, said picture formed by a frame of a plurality of fields, said picture decoding and display unit comprising:

decoding means coupled to receive said bit stream, for carrying out said decoding processing on said predictively encoded pixel data to restore said original pixel data;

storage means coupled to said decoding means, for storing said restored pixel data received from said decoding means;

read means coupled to said storage means, for reading pixel data from said storage means for outputting to said display unit for display thereon; and

control means coupled to said read means and said decoding means for making said decoding means start decoding processing of pixel data of a subsequent frame supplied subsequently to a certain frame including a last field to be finally displayed in the certain frame in response to reading of said last field from said read means, said subsequent frame supplied immediately following a picture having the decoding processing thereon completed upon the reading of said last field, said picture being different from a picture comprised of said certain frame.

9. The picture decoding and display unit in accordance with claim 8, wherein said decoding processing is carried out in units of blocks of the pixel data of prescribed sizes on a screen, said picture including M said blocks in a horizontal direction on said screen,

said control means further including delay means for delaying said timing for starting said decoding processing of said decoding means by a time required for reading said pixel data of said M blocks from said storage means.

10. The picture decoding and display unit in accordance with claim 9, wherein said delay means includes buffer memory means arranged between a pixel data output part of said storage means and an output port of said read means coupled to said display unit, for storing the pixel data received from said storage means for a prescribed time.